NORTHROP GRUMMAN

ISTR Operations Monthly Progress Report

Reporting Period: January 2022

Operable Unit 3 VOC Source Area Remedy
Former Grumman Settling Ponds, Bethpage, NY
NYSDEC Site No. 130003A
February 23, 2022

In-Situ Thermal Remediation (ISTR) Operations Monthly Progress Report

NORTHROP GRUMMAN

Prepared per Section 8.2 of the OU3 Remedial Action Work Plan (RAWP) and DER-10, Section 5.7(b):

1. Remedy Progress / Performance Monitoring
2. Ambient Air
3. Significant Activities
4. Schedule / Proposed Modifications
5. Data Tables

Remedy Progress / Performance Monitoring January 2022

NORTHROP GRUMMAN

ISTR Operations Summary

- Vapor treatment system air emissions are shown on slide 7.
- Site-wide air emissions will be reported in the next OM&M reports for the OU3 SGCS and GWCS and compared to the emissions limits specified in the 8/12/21 “Proposed Modifications to the OU3 SGCS.”
- No liquid discharges to the OU3 GWCS.

Reporting Period: January 2022

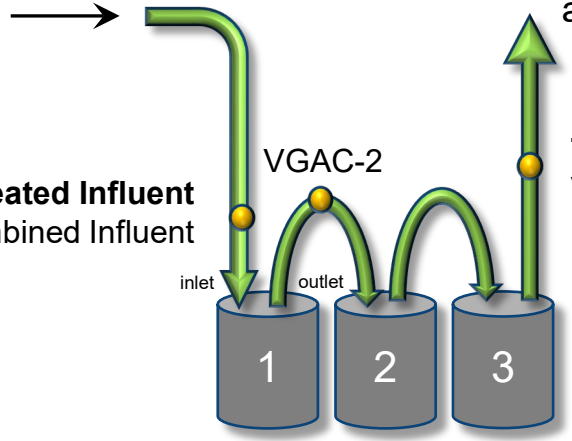
System Startup	8/26/2020
Days of Operation Since Startup	524
Estimated cumulative TVOC Mass Removed before Crossover to OU3 SGCS (10/18/21), lbs	1,366
Estimated cumulative TVOC Mass Removed after Crossover to OU3 SGCS (10/18/21), lbs	7.1
Average TVOC Mass Recovery Rate for Reporting Period, lb/day	0.06

Remedy Progress / Performance Monitoring
January 2022

NORTHROP GRUMMAN

Vapor Treatment System following Crossover

From extraction system:
- SGCS Header
- ISTR Wellfield Influent

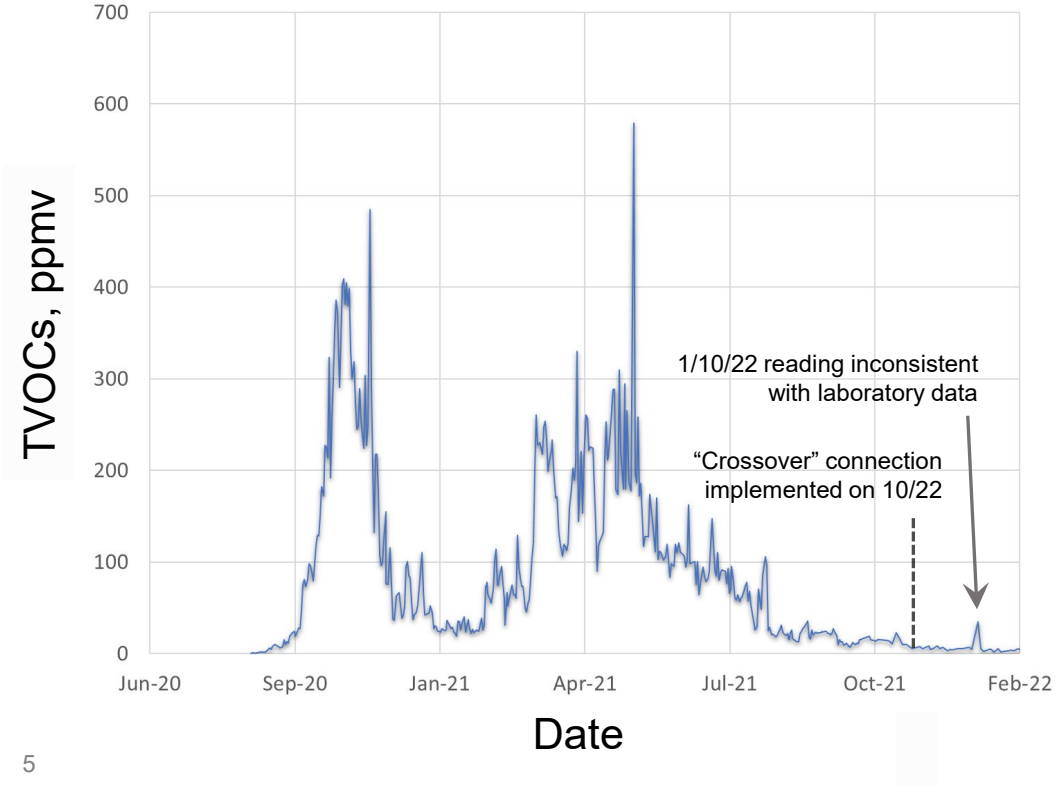


- Vapor Treatment System Sampling Locations, 5 total

Remedy Progress / Performance Monitoring January 2022

NORTHROP GRUMMAN

Vapor Treatment System Influent (PID)



Influent TVOC concentration (PID) on January 31*:

- 3.5 ppmv

Maximum influent TVOC concentration (PID) during January reporting period:

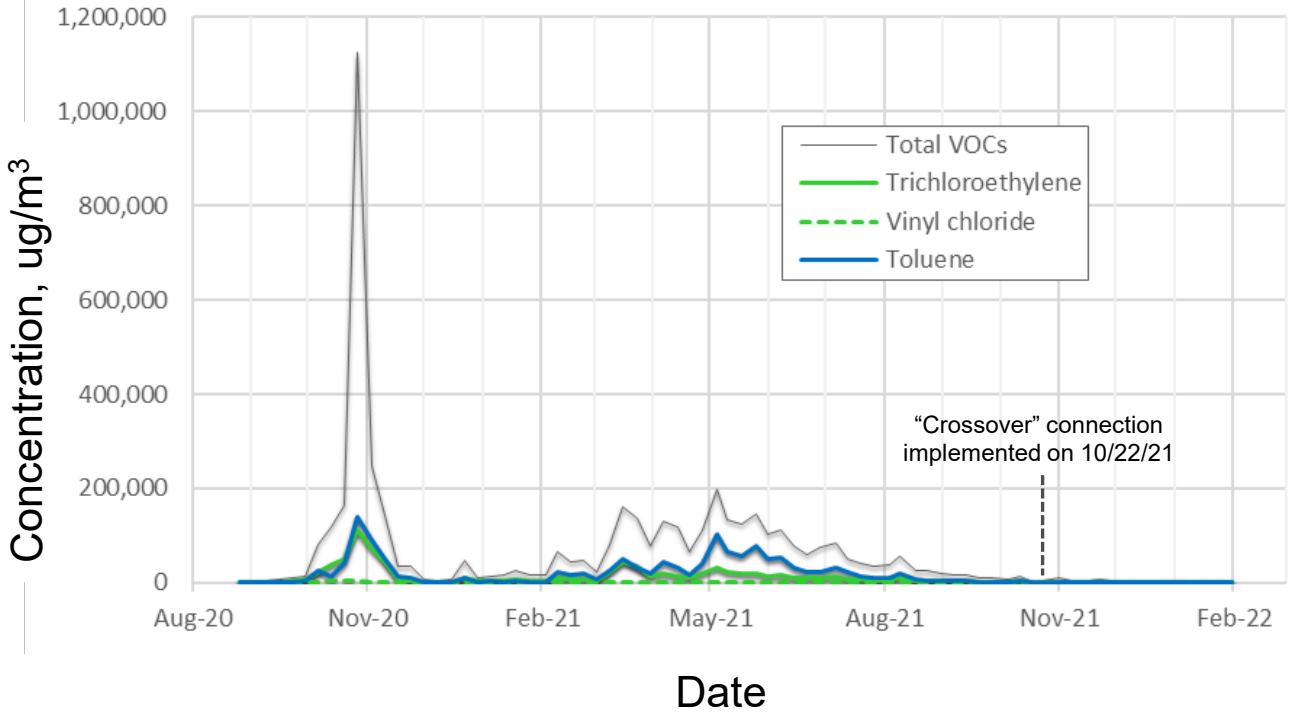
- 7.3 ppmv (January 4)

** Influent concentration for ISTR wellfield vapor stream only*

Remedy Progress / Performance Monitoring January 2022

NORTHROP GRUMMAN

Vapor Treatment System Influent (Summa)



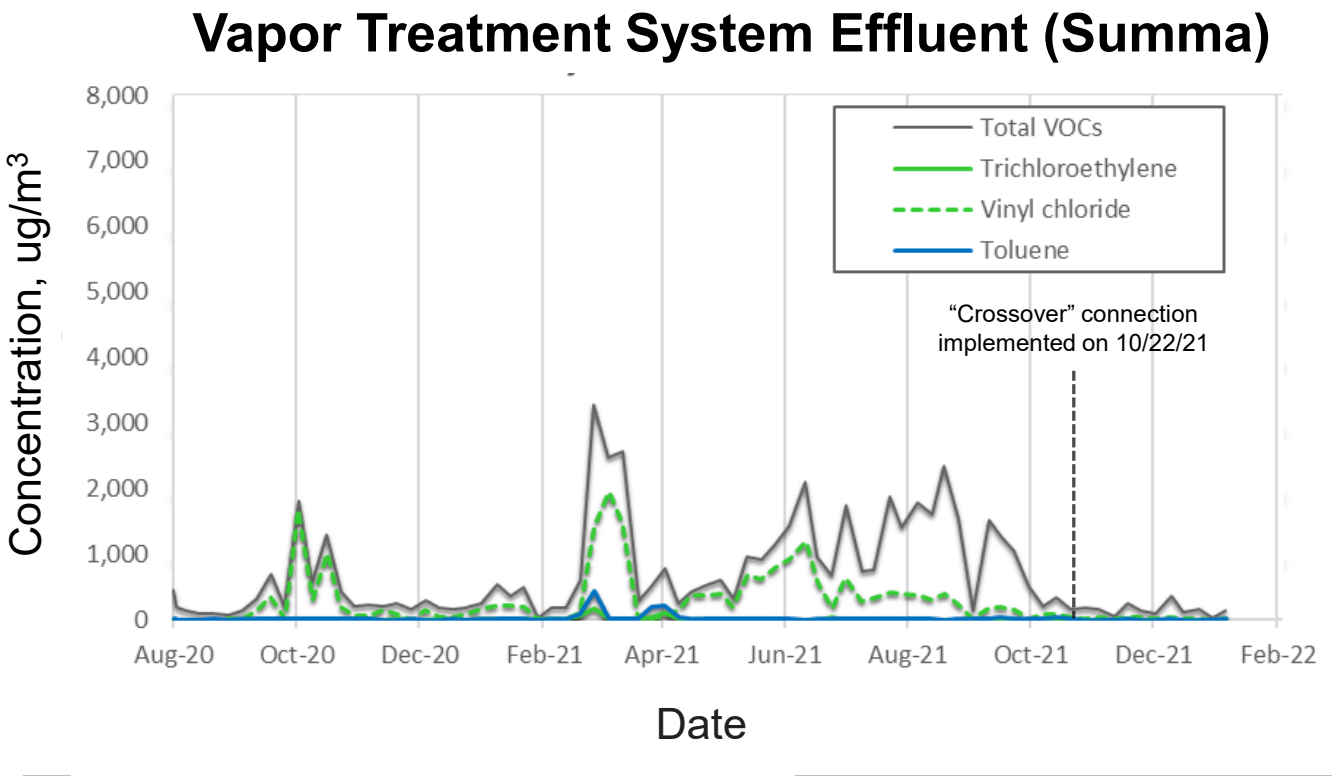
Influent concentrations (Summa) on 1/31*:

- TVOCs = 1,939 ug/m^3
- TCE = 347 ug/m^3
- Vinyl chloride = 8.4 ug/m^3

* *Influent sample collected from the "Wellfield Influent" sampling location starting 11/1/21*

Vapor treatment system analytical results for January provided in Table 1

Remedy Progress / Performance Monitoring January 2022



Effluent concentrations (Summa) on 1/31*:

- TVOCs = 124 ug/m^3
- TCE = <1 ug/m^3
- Vinyl chloride = 6.9 ug/m^3

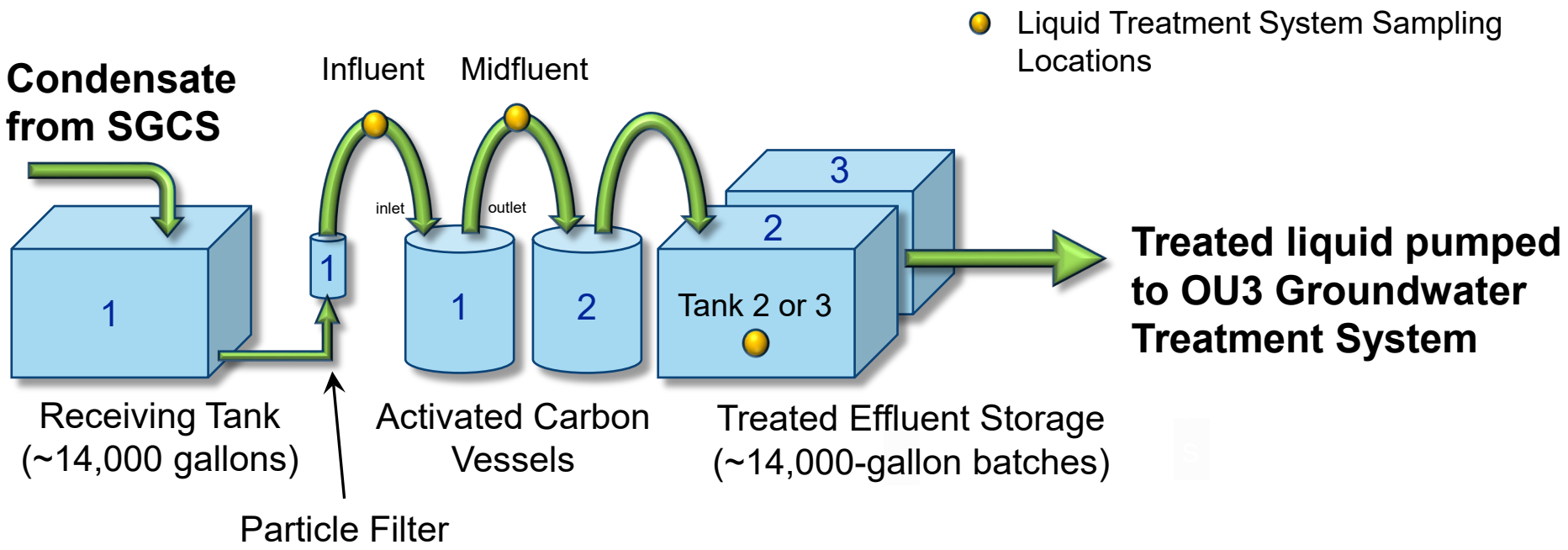
* *Effluent sample collected from the "VGAC-4" sampling location starting 11/1/21*

Vapor treatment system analytical results for January provided in Table 1

Remedy Progress / Performance Monitoring
January 2022

NORTHROP GRUMMAN

Liquid Treatment System



Remedy Progress / Performance Monitoring
January 2022

NORTHROP GRUMMAN

Cumulative Liquid Produced

- No treated effluent discharged to OU3 groundwater treatment system during reporting period.
- Cumulative total volume extracted and treated to date - 268,704 gallons.

Significant Activities
January 2022

NORTHROP GRUMMAN

Major equipment repairs and significant downtime:

- None.

Other significant activities:

- Continued to purge water from shallow VEWs.
- Discontinued LNAPL gauging in VEWs.
- Installed additional heat trace on process piping.

Planned Significant Activities During Next Two Months

- Maintain vapor extraction and treatment system operation, monitoring, and maintenance at the modified OU3 SGCS in preparation for system shutdown.
- Continue purging water from shallow VEWs.
- Submit closeout demonstration to permanently shut down ISTR operations.
- Submit closeout demonstration for LNAPL gauging and removal in VEWs.

Schedule

Activity	RAWP Schedule	Current Status
Remedial System Operation	Q3/20 – Q1/21	Q3/20 – Q1/22
Post-Treatment Confirmation Sampling	Q1/21	Complete
Remedy Cool-down	Q1/21-Q2-21	Q1/21 – Q2/22
Equipment Removal & Site Restoration	Q2/21	Q2/22

ISTR vapor extraction and treatment continues to operate in the modified OU3 SGCS.

Pending RAWP Modifications

None


NORTHROP
GRUMMAN

RE US ENGINEERS

HSW

Table 1. Vapor Treatment System Air Sampling Results
Routine Monitoring

Compound (ug/m^3)	Sample ID: / Lab Sample ID: / Date Sampled:	WELLFIELD INFLUENT JD37605-1 1/4/2022	COMBINED INFLUENT JD37605-2 1/4/2022	VGAC-2 JD37605-3 1/4/2022	VGAC-4 JD37605-4 1/4/2022
1,1,1-Trichloroethane		< 0.82	< 0.82	< 0.82	< 0.82
1,1,2,2-Tetrachloroethane		< 1.3	< 1.3	< 1.3	< 1.3
1,1,2-Trichloroethane		< 0.82	< 0.82	< 0.82	< 0.82
1,1-Dichloroethane		**10**	**6.9**	**9.3**	**1.8 J**
1,1-Dichloroethylene		**5.2**	**2.7**	**3.5**	< 0.95
1,2,4-Trichlorobenzene		< 3.6	< 3.6	< 3.6	< 3.6
1,2,4-Trimethylbenzene		< 1.7	**2.7 J**	< 1.7	< 1.7
1,2-Dibromoethane (EDB)		< 3.0	< 3.0	< 3.0	< 3.0
1,2-Dichloroethane		< 1.1	< 1.1	< 1.1	< 1.1
1,2-Dichloropropane		< 1.2	< 1.2	< 1.2	< 1.2
1,3,5-Trimethylbenzene		< 1.6	**2.3 J**	< 1.6	< 1.6
1,3-Butadiene		< 0.75	< 0.75	< 0.75	< 0.75
1,4-Dioxane		< 1.7	< 1.7	< 1.7	< 1.7
2,2,4-Trimethylpentane		**14**	**7.5**	< 1.8	**9.8**
2-Chlorotoluene		< 1.5	< 1.5	< 1.5	< 1.5
2-Hexanone		**13**	< 2.4	< 2.4	< 2.4
3-Chloropropene		< 1.0	< 1.0	< 1.0	< 1.0
4-Ethyltoluene		< 1.9	< 1.9	< 1.9	< 1.9
Acetone (2-Propanone)		**456**	**216**	**74.1**	**57.2**
Benzene		**5.1**	**1.5 J**	< 0.80	**1.5 J**
Benzyl Chloride		< 0.77	< 0.77	< 0.77	< 0.77
Bromodichloromethane		< 0.80	< 0.80	< 0.80	< 0.80
Bromoethene		< 1.0	< 1.0	< 1.0	< 1.0
Bromoform		< 2.9	< 2.9	**21**	< 2.9
Bromomethane		< 1.1	< 1.1	**2.1 J**	< 1.1
Carbon disulfide		**43.9**	**21**	**16**	**9.0**
Carbon tetrachloride		< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene		< 1.4	< 1.4	< 1.4	< 1.4
Chloroethane		< 0.71	< 0.71	< 0.71	< 0.71
Chloroform		**2.9 J**	**21**	**24**	< 0.73
Chloromethane		**1.9**	**1.5 J**	**1.8**	< 0.74
cis-1,2-Dichloroethylene		**420**	**263**	**264**	< 1.2
cis-1,3-Dichloropropene		< 1.1	< 1.1	< 1.1	< 1.1
Cyclohexane		< 1.5	< 1.5	< 1.5	< 1.5
Dibromochloromethane		< 1.8	< 1.8	< 1.8	< 1.8
Dichlorodifluoromethane		**2.1 J**	**2.1 J**	**2.4 J**	**2.7 J**
Ethanol		**25.2**	**12**	**29.0**	**18**
Ethyl Acetate		**3.1**	< 1.5	**7.6**	**195**
Ethylbenzene		**24**	**19**	< 1.0	< 1.0
Freon 113		< 0.92	< 0.92	< 0.92	< 0.92
Freon 114		< 1.4	< 1.4	< 1.4	< 1.4
Heptane		**15**	**7.8**	< 1.5	< 1.5
Hexachlorobutadiene		< 2.7	< 2.7	< 2.7	< 2.7
Hexane		**13**	**6.3**	< 1.6	**2.0 J**
Isopropyl Alcohol		< 1.8	**16**	**23**	**11**
m,p-Xylene		**58.6**	**47.3**	**5.2**	< 2.4
m-Dichlorobenzene		< 0.96	< 0.96	< 0.96	< 0.96
Methyl ethyl ketone		**114**	**55.7**	**3.5**	**3.8**
Methyl Isobutyl Ketone		**4.9**	< 1.2	< 1.2	< 1.2
Methyl Tert Butyl Ether		< 1.2	< 1.2	< 1.2	< 1.2
Methylene chloride		**3.4**	**4.9**	**5.6**	**5.2**
Methylmethacrylate		< 1.1	< 1.1	< 1.1	< 1.1
o-Dichlorobenzene		< 3.7	< 3.7	< 3.7	< 3.7
o-Xylene		**19**	**17**	< 1.3	< 1.3
p-Dichlorobenzene		< 0.90	< 0.90	< 0.90	< 0.90
Propylene		**35.4**	**16**	**16**	**14**
Styrene		< 2.0	< 2.0	< 2.0	< 2.0
Tertiary Butyl Alcohol		**8.5**	**3.3**	< 1.1	< 1.1
Tetrachloroethylene		**4.7**	**4.5**	< 0.38	< 0.38
Tetrahydrofuran		< 1.1	< 1.1	< 1.1	< 1.1
Toluene		**418**	**255**	**1.7 J**	**1.8 J**
trans-1,2-Dichloroethylene		**17**	**9.5**	**9.1**	< 1.1
trans-1,3-Dichloropropene		< 1.8	< 1.8	< 1.8	< 1.8
Trichloroethylene		**822**	**586**	**34**	< 0.41
Trichlorofluoromethane		< 0.79	< 0.79	< 0.79	< 0.79
Vinyl Acetate		< 1.6	< 1.6	< 1.6	< 1.6
Vinyl chloride		**51.1**	**23**	**22**	**32.0**
Xylenes (total)		**77.7**	**63.9**	**5.2**	< 1.3
Total (TO-15)		**2611.1**	**1631.1**	**574.9**	**364.8**

Footnotes:

ug/mg^3 micrograms per cubic meter

< Compound was not detected at or above the indicated value.

J Detected concentration is less than the quantitation limit.

TVOCs Total volatile organic compounds

RE US ENGINEERS

HSW

Table 1. Vapor Treatment System Air Sampling Results
Routine Monitoring

Compound (ug/m^3)	Sample ID: / Lab Sample ID: / Date Sampled:	WELLFIELD INFLUENT JD37955-1 1/10/2022	COMBINED INFLUENT JD37955-2 1/10/2022	VGAC-2 JD37955-3 1/10/2022	VGAC-4 JD37955-4 1/10/2022
1,1,1-Trichloroethane		< 0.82	< 0.82	< 0.82	< 0.82
1,1,2,2-Tetrachloroethane		< 1.3	< 1.3	< 1.3	< 1.3
1,1,2-Trichloroethane		< 0.82	< 0.82	< 0.82	< 0.82
1,1-Dichloroethane		**4.9**	**6.9**	**8.5**	**3.2 J**
1,1-Dichloroethylene		**2.4**	**2.7**	**3.0**	< 0.95
1,2,4-Trichlorobenzene		< 3.6	< 3.6	< 3.6	< 3.6
1,2,4-Trimethylbenzene		**2.3 J**	< 1.7	< 1.7	< 1.7
1,2-Dibromoethane (EDB)		< 3.0	< 3.0	< 3.0	< 3.0
1,2-Dichloroethane		< 1.1	< 1.1	< 1.1	< 1.1
1,2-Dichloropropane		< 1.2	< 1.2	< 1.2	< 1.2
1,3,5-Trimethylbenzene		< 1.6	< 1.6	< 1.6	< 1.6
1,3-Butadiene		< 0.75	< 0.75	< 0.75	< 0.75
1,4-Dioxane		< 1.7	< 1.7	< 1.7	< 1.7
2,2,4-Trimethylpentane		**7.5**	**7.0**	< 1.8	< 1.8
2-Chlorotoluene		< 1.5	< 1.5	< 1.5	< 1.5
2-Hexanone		< 2.4	< 2.4	< 2.4	< 2.4
3-Chloropropene		< 1.0	< 1.0	< 1.0	< 1.0
4-Ethyltoluene		< 1.9	< 1.9	< 1.9	< 1.9
Acetone (2-Propanone)		**211**	**209**	**81.5**	**25.7**
Benzene		**3.2**	**1.3 J**	< 0.80	< 0.80
Benzyl Chloride		< 0.77	< 0.77	< 0.77	< 0.77
Bromodichloromethane		< 0.80	< 0.80	< 0.80	< 0.80
Bromoethene		< 1.0	< 1.0	< 1.0	< 1.0
Bromoform		< 2.9	< 2.9	< 2.9	< 2.9
Bromomethane		< 1.1	< 1.1	< 1.1	< 1.1
Carbon disulfide		**17**	**16**	**15**	**10**
Carbon tetrachloride		**3.1**	< 1.0	**3.1**	< 1.0
Chlorobenzene		< 1.4	< 1.4	< 1.4	< 1.4
Chloroethane		< 0.71	< 0.71	< 0.71	< 0.71
Chloroform		**7.8**	**19**	**23**	< 0.73
Chloromethane		**1.6 J**	**1.5 J**	**1.6 J**	**1.7**
cis-1,2-Dichloroethylene		**209**	**259**	**259**	**1.6**
cis-1,3-Dichloropropene		< 1.1	< 1.1	< 1.1	< 1.1
Cyclohexane		**2.1 J**	**2.1 J**	< 1.5	< 1.5
Dibromochloromethane		< 1.8	< 1.8	< 1.8	< 1.8
Dichlorodifluoromethane		**2.5 J**	**1.9 J**	**2.1 J**	**2.3 J**
Ethanol		**35.2**	**13**	**12**	**15**
Ethyl Acetate		< 1.5	**5.4**	< 1.5	**5.4**
Ethylbenzene		**20**	**14**	< 1.0	< 1.0
Freon 113		< 0.92	< 0.92	< 0.92	< 0.92
Freon 114		< 1.4	< 1.4	< 1.4	< 1.4
Heptane		**9.0**	**7.8**	< 1.5	< 1.5
Hexachlorobutadiene		< 2.7	< 2.7	< 2.7	< 2.7
Hexane		< 1.6	< 1.6	< 1.6	< 1.6
Isopropyl Alcohol		**9.3**	**12**	**15**	**12**
m,p-Xylene		**50.4**	**34**	< 2.4	< 2.4
m-Dichlorobenzene		< 0.96	< 0.96	< 0.96	< 0.96
Methyl ethyl ketone		**55.2**	**47.8**	**3.5**	**2.6**
Methyl Isobutyl Ketone		**3.1 J**	< 1.2	< 1.2	< 1.2
Methyl Tert Butyl Ether		< 1.2	< 1.2	< 1.2	< 1.2
Methylene chloride		**4.5**	**3.1**	< 0.76	< 0.76
Methylmethacrylate		< 1.1	< 1.1	< 1.1	< 1.1
o-Dichlorobenzene		< 3.7	< 3.7	< 3.7	< 3.7
o-Xylene		**17**	**11**	< 1.3	< 1.3
p-Dichlorobenzene		< 0.90	< 0.90	< 0.90	< 0.90
Propylene		**15**	**15**	**16**	**17**
Styrene		< 2.0	< 2.0	< 2.0	< 2.0
Tertiary Butyl Alcohol		**4.5**	**3.6**	< 1.1	< 1.1
Tetrachloroethylene		**3.5**	**3.1**	< 0.38	< 0.38
Tetrahydrofuran		< 1.1	< 1.1	< 1.1	< 1.1
Toluene		**282**	**229**	< 0.87	< 0.87
trans-1,2-Dichloroethylene		**7.9**	**8.7**	**8.7**	< 1.1
trans-1,3-Dichloropropene		< 1.8	< 1.8	< 1.8	< 1.8
Trichloroethylene		**438**	**504**	**39**	< 0.41
Trichlorofluoromethane		**2.2**	< 0.79	< 0.79	< 0.79
Vinyl Acetate		< 1.6	< 1.6	< 1.6	< 1.6
Vinyl chloride		**23**	**23**	**26.8**	**18**
Xylenes (total)		**67.3**	**45.2**	< 1.3	< 1.3
Total (TO-15)		**1454.1**	**1461.1**	**517.8**	**114.5**

Footnotes:

ug/mg3 micrograms per cubic meter

< Compound was not detected at or above the indicated value.

J Detected concentration is less than the quantitation limit.

TVOCs Total volatile organic compounds

RE US ENGINEERS

HSW

Table 1. Vapor Treatment System Air Sampling Results
Routine Monitoring

Compound (ug/m^3)	Sample ID: / Lab Sample ID: / Date Sampled:	WELLFIELD INFLUENT JD38332-1 1/18/2022	COMBINED INFLUENT JD38332-2 1/18/2022	VGAC-2 JD38332-3 1/18/2022	VGAC-4A JD38332-5 1/18/2022
1,1,1-Trichloroethane		< 0.82	< 0.82	**2.9**	< 0.82
1,1,2,2-Tetrachloroethane		< 1.3	< 1.3	< 1.3	< 1.3
1,1,2-Trichloroethane		< 0.82	< 0.82	< 0.82	< 0.82
1,1-Dichloroethane		**11**	**6.5**	**11**	**5.7**
1,1-Dichloroethylene		**3.7**	**1.9**	**3.0**	**2.2**
1,2,4-Trichlorobenzene		< 3.6	< 3.6	< 3.6	< 3.6
1,2,4-Trimethylbenzene		**2.4 J**	< 1.7	< 1.7	< 1.7
1,2-Dibromoethane (EDB)		< 3.0	< 3.0	< 3.0	< 3.0
1,2-Dichloroethane		< 1.1	< 1.1	< 1.1	< 1.1
1,2-Dichloropropane		< 1.2	< 1.2	< 1.2	< 1.2
1,3,5-Trimethylbenzene		**2.3 J**	< 1.6	< 1.6	< 1.6
1,3-Butadiene		< 0.75	< 0.75	< 0.75	< 0.75
1,4-Dioxane		< 1.7	< 1.7	< 1.7	< 1.7
2,2,4-Trimethylpentane		**17**	< 1.8	**2.2 J**	< 1.8
2-Chlorotoluene		< 1.5	< 1.5	< 1.5	< 1.5
2-Hexanone		**23**	< 2.4	< 2.4	< 2.4
3-Chloropropene		< 1.0	< 1.0	< 1.0	< 1.0
4-Ethyltoluene		< 1.9	< 1.9	< 1.9	< 1.9
Acetone (2-Propanone)		**565**	**240**	**166**	**35.4**
Benzene		**4.8**	< 0.80	< 0.80	< 0.80
Benzyl Chloride		< 0.77	< 0.77	< 0.77	< 0.77
Bromodichloromethane		< 0.80	< 0.80	< 0.80	< 0.80
Bromoethene		< 1.0	< 1.0	< 1.0	< 1.0
Bromoform		< 2.9	< 2.9	< 2.9	< 2.9
Bromomethane		< 1.1	< 1.1	< 1.1	< 1.1
Carbon disulfide		**46.4**	**18**	**14**	**10**
Carbon tetrachloride		< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene		< 1.4	< 1.4	< 1.4	< 1.4
Chloroethane		< 0.71	< 0.71	< 0.71	< 0.71
Chloroform		**2.9 J**	**19**	**38**	**2.5 J**
Chloromethane		**2.1**	**1.6 J**	**1.8**	**1.9**
cis-1,2-Dichloroethylene		**396**	**214**	**448**	**3.2**
cis-1,3-Dichloropropene		< 1.1	< 1.1	< 1.1	< 1.1
Cyclohexane		< 1.5	< 1.5	**2.1 J**	< 1.5
Dibromochloromethane		< 1.8	< 1.8	< 1.8	< 1.8
Dichlorodifluoromethane		< 0.64	**2.6 J**	**3.0 J**	**2.9 J**
Ethanol		**36.4**	**12**	**21.9**	**31.1**
Ethyl Acetate		**27**	< 1.5	< 1.5	< 1.5
Ethylbenzene		**26**	**5.6**	< 1.0	< 1.0
Freon 113		< 0.92	< 0.92	< 0.92	< 0.92
Freon 114		< 1.4	< 1.4	< 1.4	< 1.4
Heptane		**16**	**4.5**	< 1.5	< 1.5
Hexachlorobutadiene		< 2.7	< 2.7	< 2.7	< 2.7
Hexane		**2.2 J**	< 1.6	< 1.6	< 1.6
Isopropyl Alcohol		**23**	**39.1**	**45.2**	**17**
m,p-Xylene		**61.2**	**16**	< 2.4	< 2.4
m-Dichlorobenzene		< 0.96	< 0.96	< 0.96	< 0.96
Methyl ethyl ketone		**143**	**42.8**	**4.4**	**2.1 J**
Methyl Isobutyl Ketone		**9.0**	< 1.2	< 1.2	< 1.2
Methyl Tert Butyl Ether		< 1.2	< 1.2	< 1.2	< 1.2
Methylene chloride		< 0.76	< 0.76	< 0.76	**5.6**
Methylmethacrylate		< 1.1	< 1.1	< 1.1	< 1.1
o-Dichlorobenzene		< 3.7	< 3.7	< 3.7	< 3.7
o-Xylene		**20**	**3.9**	< 1.3	< 1.3
p-Dichlorobenzene		< 0.90	< 0.90	< 0.90	< 0.90
Propylene		**41.9**	**17.7**	**19.1**	**17**
Styrene		< 2.0	< 2.0	**2.7 J**	< 2.0
Tertiary Butyl Alcohol		**9.7**	**2.0 J**	**2.3 J**	< 1.1
Tetrachloroethylene		**5.0**	**2.4**	< 0.38	< 0.38
Tetrahydrofuran		< 1.1	< 1.1	< 1.1	< 1.1
Toluene		**340**	**113**	**2.6 J**	< 0.87
trans-1,2-Dichloroethylene		**15**	**6.3**	**12**	< 1.1
trans-1,3-Dichloropropene		< 1.8	< 1.8	< 1.8	< 1.8
Trichloroethylene		**752**	**419**	**196**	< 0.41
Trichlorofluoromethane		< 0.79	< 0.79	< 0.79	**2.5**
Vinyl Acetate		< 1.6	**3.9**	< 1.6	< 1.6
Vinyl chloride		**40.1**	**19**	**21**	**12**
Xylenes (total)		**81.2**	**20**	< 1.3	< 1.3
Total (TO-15)		**2644.1**	**1210.9**	**1019.2**	**151.1**

Footnotes:

ug/mg3 micrograms per cubic meter

< Compound was not detected at or above the indicated value.

J Detected concentration is less than the quantitation limit.

TVOCs Total volatile organic compounds

RE US ENGINEERS

HSW

Table 1. Vapor Treatment System Air Sampling Results
Routine Monitoring

Compound (ug/m^3)	Sample ID: / Lab Sample ID: / Date Sampled:	WELLFIELD INFLUENT JD38600-2 1/24/2022	COMBINED INFLUENT JD38600-3 1/24/2022	OU3 SGCS INFLUENT JD38600-1 1/24/2022	VGAC-2 JD38600-4 1/24/2022	VGAC-4 JD38600-5 1/24/2022	DUPLICATE (VGAC-2) JD38600-6 1/24/2022
1,1,1-Trichloroethane		< 0.82	< 0.82	< 0.82	**2.3**	< 0.82	**2.8**
1,1,2,2-Tetrachloroethane		< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3
1,1,2-Trichloroethane		< 0.82	< 0.82	< 0.82	< 0.82	< 0.82	< 0.82
1,1-Dichloroethane		**9.7**	**7.3**	**5.3**	**9.7**	< 0.93	**11**
1,1-Dichloroethylene		**4.0**	**1.9**	< 0.95	**2.6**	< 0.95	**2.9**
1,2,4-Trichlorobenzene		< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6
1,2,4-Trimethylbenzene		**3.7 J**	**1.9 J**	< 1.7	< 1.7	< 1.7	< 1.7
1,2-Dibromoethane (EDB)		< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
1,2-Dichloroethane		< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1
1,2-Dichloropropane		< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
1,3,5-Trimethylbenzene		**3.0 J**	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6
1,3-Butadiene		< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75
1,4-Dioxane		< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7
2,2,4-Trimethylpentane		**15**	**5.6**	< 1.8	< 1.8	< 1.8	< 1.8
2-Chlorotoluene		< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
2-Hexanone		< 2.4	< 2.4	< 2.4	< 2.4	< 2.4	< 2.4
3-Chloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Ethyltoluene		< 1.9	< 1.9	< 1.9	< 1.9	< 1.9	< 1.9
Acetone (2-Propanone)		**530**	**199**	**12**	**131**	**5.7**	**151**
Benzene		**5.8**	**1.3 J**	**2.8**	< 0.80	< 0.80	< 0.80
Benzyl Chloride		< 0.77	< 0.77	< 0.77	< 0.77	< 0.77	< 0.77
Bromodichloromethane		< 0.80	< 0.80	< 0.80	< 0.80	< 0.80	< 0.80
Bromoethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform		< 2.9	< 2.9	< 2.9	< 2.9	< 2.9	< 2.9
Bromomethane		< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1
Carbon disulfide		**32.4**	**12**	< 0.56	**14**	< 0.56	**17**
Carbon tetrachloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene		< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Chloroethane		< 0.71	< 0.71	< 0.71	< 0.71	< 0.71	< 0.71
Chloroform		**2.4 J**	**21**	**28**	**29**	< 0.73	**39**
Chloromethane		**2.3**	**1.6 J**	**1.1 J**	**1.6 J**	**1.5 J**	**1.7**
cis-1,2-Dichloroethylene		**345**	**220**	**134**	**404**	< 1.2	**551**
cis-1,3-Dichloropropene		< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1
Cyclohexane		**4.5**	< 1.5	< 1.5	< 1.5	< 1.5	**2.3 J**
Dibromochloromethane		< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Dichlorodifluoromethane		< 0.64	< 0.64	**2.2 J**	**1.9 J**	**2.2 J**	**2.0 J**
Ethanol		**30.3**	**12**	**5.5**	**15**	**10**	**13**
Ethyl Acetate		**4.7**	**4.0**	**2.0 J**	< 1.5	< 1.5	**7.9**
Ethylbenzene		**29**	**10**	< 1.0	< 1.0	< 1.0	< 1.0
Freon 113		< 0.92	< 0.92	< 0.92	< 0.92	< 0.92	< 0.92
Freon 114		< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Heptane		**18**	**6.1**	< 1.5	< 1.5	< 1.5	< 1.5
Hexachlorobutadiene		< 2.7	< 2.7	< 2.7	< 2.7	< 2.7	< 2.7
Hexane		**2.3 J**	< 1.6	< 1.6	< 1.6	< 1.6	**2.7 J**
Isopropyl Alcohol		**80.1**	**49.7**	**13**	**32.2**	**6.6**	**17**
m,p-Xylene		**73.4**	**27**	**3.8**	< 2.4	< 2.4	< 2.4
m-Dichlorobenzene		< 0.96	< 0.96	< 0.96	< 0.96	< 0.96	< 0.96
Methyl ethyl ketone		**143**	**45.4**	**2.0 J**	**2.4**	< 1.3	**3.2**
Methyl Isobutyl Ketone		**6.6**	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Methyl Tert Butyl Ether		< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Methylene chloride		< 0.76	< 0.76	< 0.76	< 0.76	< 0.76	< 0.76
Methylmethacrylate		< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1
o-Dichlorobenzene		< 3.7	< 3.7	< 3.7	< 3.7	< 3.7	< 3.7
o-Xylene		**24**	**9.1**	< 1.3	< 1.3	< 1.3	< 1.3
p-Dichlorobenzene		< 0.90	< 0.90	< 0.90	< 0.90	< 0.90	< 0.90
Propylene		**37.8**	**15**	< 0.98	**17.3**	< 0.98	**19.4**
Styrene		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Tertiary Butyl Alcohol		**7.3**	**1.6 J**	< 1.1	**1.8 J**	< 1.1	**1.8 J**
Tetrachloroethylene		**4.2**	**2.7**	**1.6**	< 0.38	< 0.38	< 0.38
Tetrahydrofuran		< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	**1.7 J**
Toluene		**362**	**132**	**8.7**	**1.7 J**	< 0.87	**3.5**
trans-1,2-Dichloroethylene		**14**	**6.7**	**2.2 J**	**12**	< 1.1	**15**
trans-1,3-Dichloropropene		< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Trichloroethylene		**666**	**389**	**203**	**77.9**	< 0.41	**143**
Trichlorofluoromethane		< 0.79	**4.0**	< 0.79	< 0.79	**2.2 J**	< 0.79
Vinyl Acetate		< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6
Vinyl chloride		**38.9**	**14**	< 0.72	**19**	< 0.72	**21**
Xylenes (total)		**97.7**	**37**	**3.8**	< 1.3	< 1.3	< 1.3
Total (TO-15)		**2499.7**	**1200.8**	**427.2**	**775.4**	**28.2**	**1029.9**

Footnotes:

ug/mg3 micrograms per cubic meter

< Compound was not detected at or above the indicated value.

J Detected concentration is less than the quantitation limit.

TVOCs Total volatile organic compounds

RE US ENGINEERS

HSW

Table 1. Vapor Treatment System Air Sampling Results
Routine Monitoring

Compound (ug/m^3)	Sample ID: / Lab Sample ID: / Date Sampled:	WELLFIELD INFLUENT JD38920-1 1/31/2022	COMBINED INFLUENT JD38920-2 1/31/2022	VGAC-2 JD38920-3 1/31/2022	VGAC-4 JD38920-4 1/31/2022
1,1,1-Trichloroethane		< 1.3	< 0.82	**5.3**	< 0.82
1,1,2,2-Tetrachloroethane		< 2.1	< 1.3	< 1.3	< 1.3
1,1,2-Trichloroethane		< 1.3	< 0.82	< 0.82	< 0.82
1,1-Dichloroethane		**3.8 J**	**4.5**	**17**	**11**
1,1-Dichloroethylene		< 1.5	< 0.95	**3.1**	**3.4**
1,2,4-Trichlorobenzene		< 5.6	< 3.6	< 3.6	< 3.6
1,2,4-Trimethylbenzene		< 2.7	< 1.7	< 1.7	< 1.7
1,2-Dibromoethane (EDB)		< 4.6	< 3.0	< 3.0	< 3.0
1,2-Dichloroethane		< 1.7	< 1.1	< 1.1	< 1.1
1,2-Dichloropropane		< 1.8	< 1.2	< 1.2	< 1.2
1,3,5-Trimethylbenzene		< 2.5	< 1.6	< 1.6	< 1.6
1,3-Butadiene		< 1.2	< 0.75	< 0.75	< 0.75
1,4-Dioxane		< 2.6	< 1.7	< 1.7	< 1.7
2,2,4-Trimethylpentane		**7.9**	< 1.8	**2.1 J**	< 1.8
2-Chlorotoluene		< 2.3	< 1.5	< 1.5	< 1.5
2-Hexanone		< 3.7	< 2.4	< 2.4	< 2.4
3-Chloropropene		< 1.6	< 1.0	< 1.0	< 1.0
4-Ethyltoluene		< 2.9	< 1.9	< 1.9	< 1.9
Acetone (2-Propanone)		**323**	**101**	**175**	**23**
Benzene		**5.1**	< 0.80	< 0.80	**1.5 J**
Benzyl Chloride		< 1.2	< 0.77	< 0.77	< 0.77
Bromodichloromethane		< 1.3	< 0.80	< 0.80	< 0.80
Bromoethene		< 1.7	< 1.0	< 1.0	< 1.0
Bromoform		< 4.5	< 2.9	< 2.9	< 2.9
Bromomethane		< 1.7	< 1.1	< 1.1	< 1.1
Carbon disulfide		**32.4**	**8.4**	**16**	**14**
Carbon tetrachloride		< 1.6	< 1.0	< 1.0	< 1.0
Chlorobenzene		< 2.1	< 1.4	< 1.4	< 1.4
Chloroethane		< 1.1	< 0.71	< 0.71	< 0.71
Chloroform		< 1.1	**21**	**60.6**	**7.3**
Chloromethane		**1.2 J**	< 0.74	< 0.74	< 0.74
cis-1,2-Dichloroethylene		**112**	**129**	**718**	**9.5**
cis-1,3-Dichloropropene		< 1.7	< 1.1	< 1.1	< 1.1
Cyclohexane		< 2.3	< 1.5	**4.1**	< 1.5
Dibromochloromethane		< 2.7	< 1.8	< 1.8	< 1.8
Dichlorodifluoromethane		< 0.99	**2.0 J**	**2.4 J**	**3.6 J**
Ethanol		**33.4**	**10**	**23.6**	**26.2**
Ethyl Acetate		**741**	< 1.5	< 1.5	< 1.5
Ethylbenzene		**6.1**	**2.0 J**	< 1.0	< 1.0
Freon 113		< 1.5	< 0.92	< 0.92	< 0.92
Freon 114		< 2.2	< 1.4	< 1.4	< 1.4
Heptane		**4.0 J**	< 1.5	< 1.5	< 1.5
Hexachlorobutadiene		< 4.1	< 2.7	< 2.7	< 2.7
Hexane		< 2.4	< 1.6	< 1.6	< 1.6
Isopropyl Alcohol		**136**	**4.9**	**11**	**5.4**
m,p-Xylene		**14**	**4.8**	< 2.4	< 2.4
m-Dichlorobenzene		< 1.5	< 0.96	< 0.96	< 0.96
Methyl ethyl ketone		**50.1**	**22**	**5.6**	**2.1 J**
Methyl Isobutyl Ketone		< 1.8	< 1.2	< 1.2	< 1.2
Methyl Tert Butyl Ether		< 1.8	< 1.2	< 1.2	< 1.2
Methylene chloride		< 1.2	< 0.76	< 0.76	< 0.76
Methylmethacrylate		< 1.8	< 1.1	< 1.1	< 1.1
o-Dichlorobenzene		< 5.7	< 3.7	< 3.7	< 3.7
o-Xylene		**4.8 J**	**1.7 J**	< 1.3	< 1.3
p-Dichlorobenzene		< 1.4	< 0.90	< 0.90	< 0.90
Propylene		**27.3**	**9.4**	**11**	**7.9**
Styrene		< 3.1	< 2.0	< 2.0	< 2.0
Tertiary Butyl Alcohol		< 1.8	**1.5 J**	< 1.1	< 1.1
Tetrachloroethylene		**4.7**	**3.8**	< 0.38	< 0.38
Tetrahydrofuran		< 1.7	< 1.1	< 1.1	< 1.1
Toluene		**66.3**	**18**	**3.5**	**2.1 J**
trans-1,2-Dichloroethylene		**4.8**	**2.7 J**	**17**	< 1.1
trans-1,3-Dichloropropene		< 2.9	< 1.8	< 1.8	< 1.8
Trichloroethylene		**347**	**270**	**154**	< 0.41
Trichlorofluoromethane		< 1.2	< 0.79	< 0.79	< 0.79
Vinyl Acetate		**6.0**	< 1.6	< 1.6	< 1.6
Vinyl chloride		**8.4**	**2.5**	**2.3**	**6.9**
Xylenes (total)		**19**	**6.5**	< 1.3	< 1.3
Total (TO-15)		**1939.5**	**619.2**	**1231.6**	**123.9**

Footnotes:

ug/mg3 micrograms per cubic meter

< Compound was not detected at or above the indicated value.

J Detected concentration is less than the quantitation limit.

TVOCs Total volatile organic compounds